

a first channel formed at a boundary between the first and second diffusion regions;

a second channel formed at a boundary between the first and third diffusion regions;

a contact array comprising at least one contact formed over the first diffusion region for providing conductive contact to the first diffusion region;

a first group of at least one island disposed in the first diffusion region between the contact array and the first channel;

a second group of at least one island disposed in the first diffusion region between the contact array and the second channel,

wherein said first and second groups include all islands in the first diffusion region and said first and second groups being disposed non-symmetrically about a plane perpendicular to a top surface of the semiconductor layer, wherein the plane extends along the contact array.

--104. (New) The ESD protection device of claim 102, wherein the plane is parallel to the boundary between the first and second diffusion regions.--

REMARKS

By this Amendment, Applicant proposes canceling claim 103 without prejudice or disclaimer of the subject matter thereof; proposes amending claims 1, 101, and 102 to clarify the subject matter of these claims; and proposes adding new claim 104 to protect additional aspects related to the present invention. Upon entry of this amendment, claims 1-102 and 104 are pending with claims 20-100 being withdrawn from consideration as drawn to a nonelected invention.

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In the Final Office Action, the Examiner rejected claims 1-19 and 101-103 under 35 U.S.C. § 112, first paragraph; rejected claims 1-19 and 101-103 under 35 U.S.C. § 112, second paragraph; rejected claims 1-19 and 101-103 under 35 U.S.C. § 103(a) as unpatentable over Prior Art Fig. 1; and rejected claims 1-19 and 101-103 under 35 U.S.C. § 103(a) as unpatentable over Lin, U.S. Patent No. 5,721,439 ("Lin"). Applicant addresses these rejections below.

I. Response to Rejections under 35 U.S.C. § 112

The Examiner alleged that claims 1-19 and 101-103 contain subject matter which was not described in the specification in such a way to reasonably convey to one skilled in the art that the Applicant, at the time of invention, had possession of the claimed invention. Further, the Examiner alleged that the amendment to the claims by the March 18, 2003 Amendment render the claims indefinite. The Examiner, generally, alleged that the claims' recitations of non-symmetrically positioned islands is indefinite and not supported by the specification. More particularly, the Examiner advanced four main arguments in the rejection under sections 112, first paragraph and second paragraph. These arguments are as follows:

A. The newly amended language of a symmetry axis perpendicular to the channel region did not overcome the section 112, first paragraph, rejection and introduced a section 112, second paragraph, issue. (FOA at p. 2).

B. Regions 604 illustrated in Fig 8 are symmetrical according to the Webster's dictionary definition of "symmetrical". (FOA at pp. 2-3).

C. The claim element "at least one island formed in the first diffusion region" recited in claim 1 is not supported by the specification, particularly Fig. 8 because Fig. 8

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illustrates that the island 604 is formed partially outside the first diffusion region. (FOA at p. 3).

D. The claim element "a mirror-symmetry plane perpendicular to the semiconductor layer extending from a center line of said contact array" is vague and indefinite. (FOA at p. 3).

In response, Applicant addresses each of these arguments as follows:

A. Applicant disagrees with the Examiner regarding the amended language, but, in order to advance prosecution, proposes amending claim 1 to more clearly define the non-symmetry of the at least one island.

B. Applicant submits that the Examiner's arguments regarding the symmetry of island 604 are unclear and that the islands are in fact non-symmetric according the Examiner's definition.

C. Applicant submits that the Examiner has given the claims an overly narrow interpretation of the term "in," as recited in claim 1.

D. Applicant disagrees with the Examiner's allegation regarding the amended language, but, in order to advance prosecution, proposes amending claim 102 to more clearly define the "non-symmetry of the at least one island."

Applicant addresses each of these arguments separately below in more detail.

A. Applicants disagree with the Examiner regarding the amended language, but, in order to advance prosecution, proposes amending claim 1 to more clearly define the non-symmetry of the at least one island.

The Examiner alleged that the phrase "perpendicular to the channel region" is indefinite since no direction and the midpoint is somewhat questionable. Applicant respectfully disagrees with the Examiner and submits that the language of claim 1 is

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definite and that Fig. 8, for example, provides support for the language. Nonetheless, Applicant proposes amending claim 1 to more clearly define the non-symmetry of the at least one island.

Specifically, upon entry of this amendment, claim 1 will recite, *inter alia*, "a channel region formed at a boundary between the first and second diffusion regions, wherein said channel region is bounded by first and second diffusion edges of the first diffusion region." Applicant submits that this more clearly defines the location of the channel region.

Moreover, upon entry of this amendment, claim 1 will recite, *inter alia*, "at least one island formed in the first diffusion region, the at least one island being positioned non-symmetrically about a plane perpendicular to a top surface of the semiconductor layer and perpendicular to the boundary, wherein said plane bisects the channel region." Applicant respectfully submits that this amended language more clearly defines the non-symmetry of the at least one island. Particularly, the proposed amendment specifically defines a plane about which the at least one island is non-symmetric.

Furthermore, Applicant respectfully submits that the claim as proposed to be amended is sufficiently supported by the specification. Support for the claim recitation "at least one island formed in the first diffusion region, the at least one island being positioned non-symmetrically about a plane perpendicular to a top surface of the semiconductor layer and perpendicular to the boundary, wherein said plane bisects the channel region," may be found, for example, at page 12 of the specification describing

Fig. 8.

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Specifically, the specification recites “[i]sland 604 is non-symmetrically disposed relative to island 602 in that the right end of island 604 extends beyond the right edge of region 406 while the left end of island 604 is within region 406,” (page 12, lines 11-13). See also, Figs. 6, 7, 14, and p. 18. With reference to Fig. 8, a symmetry plane would exist along axis A-A’ and perpendicular to a top surface of the semiconductor layer (i.e., would extend upward out of Fig. 8). As can be seen in Fig. 8, island 604 is non-symmetric about this plane. That is, the section of island 604 to the left of axis A-A’ is shorter than the section of island 604 to the right of axis A-A’. Furthermore, as illustrated in Fig. 8, an alternative aspect of non-symmetry is that, island 604 has an end at a distance to the left of the plane but an island end at the same distance to the right of this plane cannot be found. Thus, island 604 is non-symmetric about a plane that would exist along axis A-A’ and perpendicular to the top surface of the semiconductor layer. Therefore, claim 1 is clearly supported by the specification. Accordingly, the Examiner should enter the amendment to claim 1 and withdraw the rejections under sections 112, first paragraph, and 112, second paragraph.

Applicants also note that the Examiner stated “[t]ypically, detail to this extreme [defining non-symmetry] is not necessary, however, since Applicant is trying to distinguish over a prior art that is very similar, the exact layout structure is necessary.” (FOA at ¶ 2). Applicant is unclear as to exactly what position the Examiner is advancing by this statement. Since it is included in the arguments regarding section 112, it appears to Applicant that the Examiner may be alleging specific structure is “necessary” under section 112 because the prior art is “allegedly” very similar (a point which Applicant does not concede).

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As such, Applicant respectfully points out that an amendment to overcome "allegedly" similar prior art is not necessary to satisfy the requirements of section 112. Whether or not the requirements of section 112 are satisfied is a separate determination than those involving section 102 for novelty and section 103 for obviousness. Applicant acknowledges that any amendment made to the claims, regardless of the purpose, must meet the requirements of section 112. Such amendment, however, will satisfy section 112 if it is supported by the specification and is definite, regardless of what the prior art may or may not disclose. Thus, Applicant requests that the Examiner clarify his statement regarding "necessary" structure should the rejection on these grounds be maintained.

B. Applicant submits that the Examiner's arguments regarding the symmetry of island 604 is unclear and that the islands are in fact non-symmetric according the Examiner's definition.

The Examiner alleged that island 604 illustrated in Fig. 8 is symmetric. In support, the Examiner quoted a Webster's dictionary definition of symmetry as: "Correspondence of form and arrangement of parts on opposite sides of a boundary, as a plane or line or around a point or axis." (FOA at ¶ 3). Then, the Examiner concluded "under this definition, the regions 604 are symmetrical." Applicant points out that this argument is unclear because the Examiner fails to point out what boundary, plane, or axis island 604 is around. Applicant submits that the Examiner's conclusion is incorrect and that island 604 is non-symmetric about a plane.

More particularly, with reference to Fig. 8, a symmetry plane would exist along axis A-A' and perpendicular to a top surface of the semiconductor layer (i.e., would extend upward out of Fig. 8). As can be seen in Fig. 8, island 604 is non-symmetric about this plane. That is, the section of island 604 to the left of axis A-A' is shorter than

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the section of island 604 to the right of axis A-A'. Thus, island 604 is non-symmetric about a plane that would exist along axis A-A' and perpendicular to the surface of the semiconductor layer.

C. Applicant submits that the Examiner has given the claims an overly narrow interpretation of the term "in" recited in claim 1

The Examiner alleged that "Applicant's arguments are not commensurate in scope with the claims which brings up another problem with the claim language." The Examiner quoted the claim recitation: "the island formed in the first diffusion region." The Examiner alleged that "Applicant's arguments hinge on part of the island region being non-symmetrical based upon a part that is not actually in the diffusion region." (FOA at ¶ 3).

In response, Applicant directs the Examiner to his statement at the end of page 3 that "claims are given their broadest interpretation consistent with the specification." As such, Applicants submit that the Examiner is applying an overly narrow interpretation of the term "in." Specifically, the Examiner appears to be construing "in" to mean "completely" or "entirely" "in." However, the term "in" is not necessarily limited to "completely" or "entirely" "in." Furthermore, Applicant's specification supports a broad interpretation of "in." See Fig. 8. Thus, Applicant submits that the previously submitted arguments are commensurate in scope with the claims.

Nonetheless, in order to advance prosecution, Applicant proposes amending claim 1 to read "at least one island formed at least partially in the first diffusion region."

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D. Applicant disagrees with the Examiner's allegation regarding the amended language, but, in order to advance prosecution, proposes amending claim 102 to more clearly define the non-symmetry of the at least one island.

The Examiner alleged that the phrase "a mirror-symmetry plane perpendicular to the semiconductor layer extending from a center line of said contact array" is vague and indefinite. Applicant respectfully disagrees with the Examiner and submits that the language of claim 102 is definite and that Fig. 8, for example, provides support for the language. Nonetheless, Applicant proposes amending claim 102 to more clearly define the non-symmetry of the groups of islands.

Specifically, upon entry of this amendment, claim 102 will recite, *inter alia*, "wherein ... first and second groups include all islands in the first diffusion region and said first and second groups being disposed non-symmetrically about a plane perpendicular to a top surface of the semiconductor layer, wherein the plane extends along the contact array." Applicant submits that this more clearly defines the non-symmetry of the groups of islands.

Furthermore, Applicant respectfully submits that the claim as proposed to be amended is sufficiently supported by the specification. For example, support for these claim recitations may be found at page 12 of the specification describing Fig. 8.

Specifically, the specification recites: "[i]sland 604 is non-symmetrically disposed relative to island 602 in that the right end of island 604 extends beyond the right edge of region 406 while the left end of island 604 is within region 406," (page 12, lines 11-13). See also, Figs. 6, 7, 14, and p. 18. With reference to Fig. 8, a symmetry plane would exist along axis B-B' and perpendicular to a top surface of the semiconductor layer (i.e., would extend upward out of Fig. 8). As can be seen in Fig. 8, islands 602 and 604 are

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non-symmetrically positioned about this plane. Thus, islands 602 and 604 are non-symmetrically formed about a plane that would exist along axis B-B' and perpendicular to the top surface of the semiconductor layer. Therefore, claim 102 is clearly supported by the specification. Accordingly, the Examiner should enter the amendment to claim 102 and withdraw the rejections under sections 112, first paragraph, and 112, second paragraph.

II. Response to Rejections under 35 U.S.C. § 103(a)

The Examiner rejected claims 1-19 and 101-103 as unpatentable over Prior Art Figure 1 or Lin. For the purposes of this response, Applicant will refer to Lin since Prior Art Figure 1 is a reproduction of Lin's Figure 8. In response, Applicant asserts that a *prima facie* case of obviousness has not been established.

In order to establish a *prima facie* case of obviousness, three basic criteria must be met. First, the prior art reference (or references when combined) must teach or suggest all the claim elements. Furthermore, "[a]ll words in a claim must be considered in judging the patentability of that claim against the prior art." M.P.E.P. § 2143.01 (8th Ed., Aug. 2001), (quoting *In re Wilson*, 424 F.2d 1382, 1385, 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970)). Second, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify a reference or to combine reference teachings. Third, there must be a reasonable expectation of success. M.P.E.P. § 2143 at pp. 2100-122 to 127.

Claim 1 is directed to an electrostatic discharge device comprising a combination of elements including, *inter alia*, "at least one island formed in the first diffusion region, the at least one island being positioned non-symmetrically about a plane perpendicular

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to a top surface of the semiconductor layer and perpendicular to the boundary, wherein said plane bisects the channel region."

Lin is directed to electrostatic discharge circuitry. Lin discloses that the discharge circuitry comprises a number of isolated islands 81-86 arranged in a diffusion region. See Lin, Fig. 8. The Examiner alleged that islands 83 and 84 are non-symmetrical in one interpretation. However, Lin explicitly teaches that islands 81-86 are symmetrically arranged. Specifically, Lin teaches "islands [81-86] are aligned along the longitudinal direction of the islands themselves, and each isolated island in a row is in relative interleaving relationship with the proximate islands in the neighboring rows at both sides." Lin, col. 5, lines 52-56. Furthermore, Lin teaches that "all the islands 81-86 are substantially the same size in terms of both width and length ... [which] allows for a symmetric alignment." Lin, col. 5, lines 61-64.

Thus, Lin fails to teach or suggest at least "at least one island formed in the first diffusion region, the at least one island being positioned non-symmetrically about a plane perpendicular to a top surface of the semiconductor layer and perpendicular to the boundary, wherein said plane bisects the channel region," as recited in claim 1. Therefore, a *prima facie* case of obviousness has not been established because Lin does not teach or suggest all the elements of claim 1. For at least this reason, claim 1 is allowable.

Claims 2-19 and 101 are allowable at least due to their dependence from allowable claim 1. "If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious." M.P.E.P. § 2143.03 at p. 2100-126 (*citing In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988)).

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Moreover, claim 102 recites, *inter alia*, "wherein ... first and second groups include all islands in the first diffusion region and said first and second groups being disposed non-symmetrically about a plane perpendicular to a top surface of the semiconductor layer and parallel to the boundary between the first and second diffusion regions, wherein the plane extends along the contact array." As advanced above, Lin is directed to a discharge protection device comprising isolated islands disposed in an evenly distributed gridwork. Lin, col. 6, lines 6-13 and Fig. 9. Thus, Lin discloses that all the islands are symmetrically disposed. Hence, Lin fails to teach or suggest all the elements recited in claim 102. Accordingly, a *prima facie* case of obviousness has not been established. For at least this reason, claim 102 is allowable.

III. New claim

Applicant proposes adding new claim 104 to protect additional aspect related to the present invention. Claim 104 depends from claim 102, and, thus, incorporates the elements of claim 102. Accordingly, Applicant submits that claim 104 is allowable over the cited prior art references for at least the reasons advanced above.

IV. Conclusion

In making the various references to the specification and drawings set forth herein, it is to be understood that Applicants are in no way intending to limit the scope of the claims to the exemplary embodiments shown in the drawings and described in the specification. Rather, Applicants expressly affirm that they are entitled to have the claims interpreted broadly, to the maximum extent permitted by statute, regulation, and applicable case law.

Applicant respectfully requests that this Amendment under 37 C.F.R. § 1.116 be entered by the Examiner, placing claims 1-19, 101-102, and 104 in condition for

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allowance. Applicant submits that the proposed amendments of claims 1, 101, and 102 and addition of claim 104 do not raise new issues or necessitate the undertaking of any additional search of the art by the Examiner, since all of the elements and their relationships claimed were either earlier claimed or inherent in the claims as examined. Therefore, this Amendment should allow for immediate action by the Examiner.

Furthermore, Applicant respectfully points out that the final action by the Examiner presented some new arguments as to the application of the art against Applicant's invention. It is respectfully submitted that the entering of the Amendment would allow Applicant to reply to the final rejections and place the application in condition for allowance.

Finally, Applicant submits that the entry of the amendment would place the application in better form for appeal, should the Examiner dispute the patentability of the pending claims.

Attached hereto is a marked-up version of the changes made to the specification and claims by this Amendment. The attachment is captioned "Appendix to Amendment of July 29, 2003".

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

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Appendix to Amendment of July 29, 2003

1. (Amended) An electrostatic discharge [(EDS)](ESD) protection device, comprising:

a semiconductor layer;

a first diffusion region formed in the layer;

a second diffusion region formed in the layer adjacent to and spaced apart from the first diffusion region;

a channel region formed at a boundary between the first and second diffusion regions, wherein said channel region is bounded by first and second diffusion edges of the first diffusion region; and

at least one island formed at least partially in the first diffusion region, the at least one island being positioned non-symmetrically [with respect to a symmetry axis] about a plane perpendicular to a top surface of the semiconductor layer and perpendicular to the boundary, wherein said plane bisects the channel region

[said symmetry axis extending from a midpoint of the channel region perpendicular to the channel region and in parallel to a surface of the semiconductor layer].

101. (Amended) The ESD protection device of claim 1, wherein

[said channel region is bounded by first and second diffusion edges of the first diffusion region];

said at least one island having a first island edge near said first diffusion edge and a second island edge near said second diffusion edge;

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a first gap of at least zero spacing between the first diffusion edge and a first nearest island edge;

a second gap of at least zero spacing between the second diffusion edge and a second nearest island edge; and said first gap being larger than the second gap.

102. (Amended) An electrostatic discharge (ESD) protection device, comprising:

a semiconductor layer;

a first diffusion region formed in the layer;

a second and a third diffusion region formed in the layer each adjacent to and spaced apart from the first diffusion region;

a first channel formed at a boundary between the first and second diffusion regions;

a second channel formed at a boundary between the first and third diffusion regions;

a contact array comprising at least one contact formed over the first diffusion region for providing conductive contact to the first diffusion region;

a first group of at least one island disposed in the first diffusion region between the contact array and the first channel;

a second group of at least one island disposed in the first diffusion region between the contact array and the second channel,

wherein said first and second groups include all islands in the first diffusion region and said first and second groups being disposed non-symmetrically [with respect to] about a [mirror-symmetry] plane perpendicular to a top surface of the semiconductor

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layer, wherein the plane extends along the contact array [extending from a center line of said contact array].

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